

Appln No. 10/027,700
Amdt date March 16, 2005
Reply to Office action of October 19, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Withdrawn) A programmed computer system for creating and maintaining one or more backup copies of electronic data, comprising:

means to determine whether a mirror copy exists of particular source electronic data, including operating system software, files, directories, and/or physical storage volumes;

means to create a mirror copy of said particular electronic data, if such a mirror copy does not already exist, on a volume and/or storage device other than the volume and/or storage device on which the said particular source electronic data is stored;

means to duplicate all file operations directed to said particular source electronic data on the mirror copy of the electronic data.

2. (Withdrawn) The programmed computer system for creating and maintaining one or more backup copies of electronic data of claim 1 further comprising:

means to copy said mirrored copy after duplicate file operations have been performed as a date-stamped, time-stamped version;

means to maintain multiple versions of said mirror copies;

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means to provide a computer user with an opportunity to select one of said versions for restoration as primary version of said electronic data;

means for communicating the data storage location of said selected version of electronic data to a computer operating system;

means for translating the data storage location of said selected version of electronic data to one or more application software programs so that said application software programs do not detect any change in the location of said electronic data;

means for said application software programs to request said operating system to access said selected version of electronic data as if said electronic data is located at the source storage location;

means for redirecting said operating system from said source electronic data storage location to said selected version storage location in order to provide said operating system with access to said electronic data at said selected version storage location.

3. (Withdrawn) The programmed computer system for creating and maintaining one or more backup copies of electronic data of claim 1 wherein said means to duplicate all file operations is performed every time the operating system attempts to perform a file operation on said particular source electronic data.

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4. (Withdrawn) A programmed computer system for creating and maintaining a single virtual logical volume of electronic data space with electronic data storage space located on a plurality of physical storage volumes, comprising:

means for identifying the physical location of available free electronic data storage space on a plurality of physical storage volumes;

means for communicating said available free electronic data storage space locations to a computer operating system;

means for said operating system to access said available free electronic data storage space physically located on a plurality of storage volumes as if the space appeared on a single volume.

5. (Withdrawn) A programmed computer system for creating and maintaining a single virtual logical file of electronic data from electronic data located on a plurality of physical storage volumes, comprising:

means for identifying the physical storage locations of a particular logical file of electronic data stored on a plurality of physical storage volumes;

means for communicating said electronic data storage locations to a computer operating system;

means for said operating system to access said electronic data physically located on a plurality of storage volumes as if the data appeared on a single volume.

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6. (Withdrawn) A method for creating and maintaining one or more backup copies of electronic data, comprising the steps:

determining whether a mirror copy exists of particular source electronic data, including operating system software, files, directories, and/or physical storage volumes;

creating a mirror copy of said particular electronic data, if such a mirror copy does not already exist, on a volume and/or storage device other than the volume and/or storage device on which the said particular source electronic data is stored;

duplicating all file operations directed to said particular source electronic data on the mirror copy of the electronic data.

7. (Withdrawn) A method for creating and maintaining a single virtual logical volume of electronic data space with electronic data storage space located on a plurality of physical storage volumes, comprising the steps:

identifying the physical location of available free electronic data storage space on a plurality of physical storage volumes;

communicating said available free electronic data storage space locations to a computer operating system;

accessing said available free electronic data storage space physically located on a plurality of storage volumes by said operating system as if the space appeared on a single volume.

8. (Withdrawn) A method for creating and maintaining a single virtual logical file of electronic data from electronic

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data located on a plurality of physical storage volumes, comprising the steps:

identifying the physical storage locations of a particular logical file of electronic data stored on a plurality of physical storage volumes;

communicating said electronic data storage locations to a computer operating system;

accessing said electronic data physically located on a plurality of storage volumes by said operating system as if the data appeared on a single volume.

9. (Previously Presented) A method for backing up data stored in files as the data is updated, the method comprising:

updating one of the files;

temporarily storing a copy of the updated file (mirroring);

comparing the copy of the updated file with the file prior to updating;

storing the differences in the copy of the updated file (versioning); and

repeating the foregoing steps each time one of the files is updated.

10. (Previously Presented) The method of claim 9, additionally comprising restoring one of the files to a previous condition by:

temporarily storing a copy of the current version of the file being restored;

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applying the stored differences to the stored copy of the current version to produce a copy of an earlier version of the file being restored, and

repeating the two recited steps until a desired version of the file is produced.

11. (Previously Presented) The method of claim 10, in which the temporarily stored copy is stored until the next time one of the files is updated.

12. (Previously Presented) The method of claim 9, in which the temporarily stored copy is stored until the next time one of the files is updated.

13. (Previously Presented) The method of claim 9, additionally comprising restoring one of the files to a previous condition by:

applying the stored differences to the updated file to produce a copy of a later version of the file being restored; and

repeating the recited step until a desired version of the file is produced.

14-19. (Canceled)

20. (New) A method for backing up data files after an original version of a file is stored in a first register, the method comprising the steps of:

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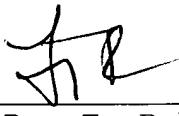
- 1) storing an updated version of the file in a second register;
- 2) storing the difference in the original and updated versions in a third register;
- 3) transferring the updated version to the first register as a mirror copy thereof;
- 4) repeating steps 1) to 3) **each time the file is updated**, retaining the differences stored in the third register.

21. (New) The method of claim 20, for reconstructing the original version from the last updated version stored in the second register comprising the steps of:

- 5) reconstructing for storage in the first register the previous version from the last updated version stored in the second register and the difference stored in the third register,
- 6) transferring the previous version stored in the second register to the first register, and
- 7) repeating steps 5) and 6) until the original version is stored in the first register.

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